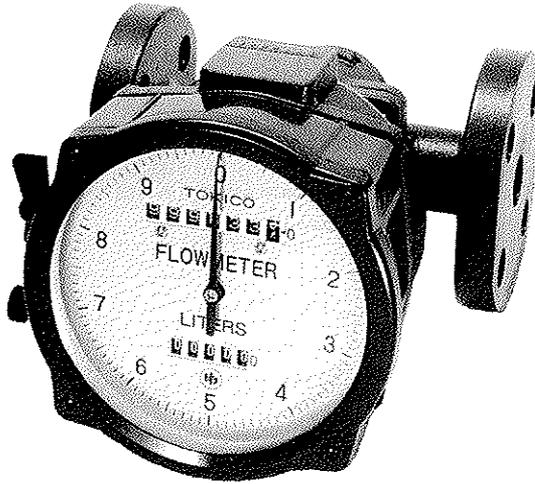
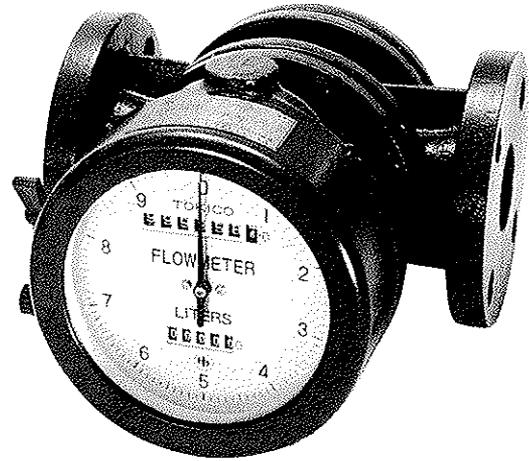


Roots and CCG Oil flowmeters



FGB type



FRO type

Tokico oil flowmeters are positive displacement type flow meter which are used in a wide variety of applications including measuring of boiler fuel oil and diesel oil, as well as for transactions for kerosene, light oil and heavy oil.

FGB type

This flowmeter employs a gear-type rotor for small-volume flow of low-viscosity oil in heat control applications, etc. It can be used without modification to measure kerosene, light oil or heavy oil. Measuring accuracy is $\pm 0.5\%$.

Two types, namely FGB type (gear type) and FRO type (Roots type) are available to provide optimum performance in accordance with the particular application.

FRO type

This flowmeter is widely used for transaction and in other applications in which a Roots type flowmeter is most suitable.

The Roots rotor rotates without physical contact, resulting in extremely low pressure loss. In addition, its accuracy remain virtually unchanged over a long period of time.

Features

● Wide flow range and high accuracy

The accuracy of these flowmeters is within $\pm 0.5\%$ over a wide range of flow rates (max. range of 1:150 for heavy oil).

● Small pressure loss.

Because the pressure loss of these meters is low, it is possible to perform accurate measuring at the suction side of a pump as well as accurate measurement of high viscosity fluids.

● Compact design.

A positive displacement type flowmeter can be used at

relatively high rotating speeds, making for compact design. In addition, the counter unit of these meters is compact yet easy-to-read, and construction is simple.

● Excellent durability

The simple construction of these meters makes for longterm durability with virtually no degradation of accuracy.

● An electrical transmitter unit attachable.

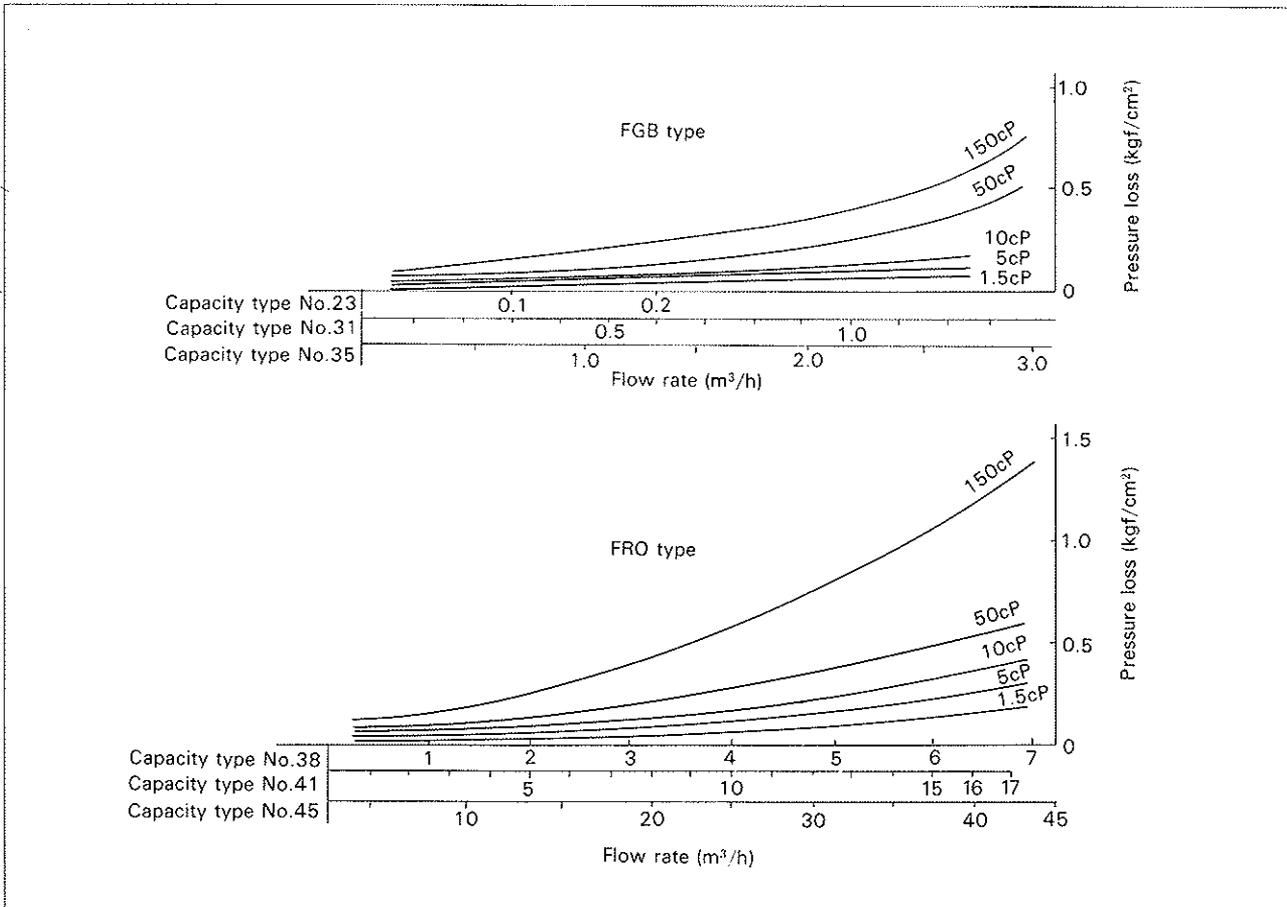
A microswitch or a reed switch type transmitter unit having simple construction and high reliability is available.

Standard specifications

Accuracy		± 0.5%
Flow range		See next page.
Max. working pressure		10kgf/cm ²
Hydraulic test pressure		20kgf/cm ²
Max. working temperature		50°C for kerosene and light oil 100°C for heavy oil (120°C with the FGB-00X and FGB-02X types)
Flange rating		JIS 10kgf/cm ² FF
Material	Body	FGB type: Bore 15mm – FC250 (Cast Iron), Bore 20, 25mm – FCD400 (Ductile Iron) FRO type: FC250 ※ 1
	Rotor	FGB type: Resin FRO type: Aluminium alloy casting
Counter unit		Integrating pointer and integrating counter (a reset counter is also available.)
Electrical transmitter unit	Transmitter	FGB type: Reed switch(S) , FRO type: Microswitch(M)
	Power supply	AC100V, 50/60Hz as standard
	Number of pulse	0 ~ 5 PPS
	Output signal	ON - OFF contact
	Transmission cable	2-wire cable with cabtype
Flow direction		Right → left
Paint color		Munsell 1.4PB3.1/1.2

※ 1: Available for body material FCD400 (Ductile Iron on bore 40, 50mm). Please inform us when enquiring.

Pressure loss characteristics



Note: This table shows general pressure loss characteristics.

In the case of high viscosity fluids, it is possible to reduce pressure loss even further.

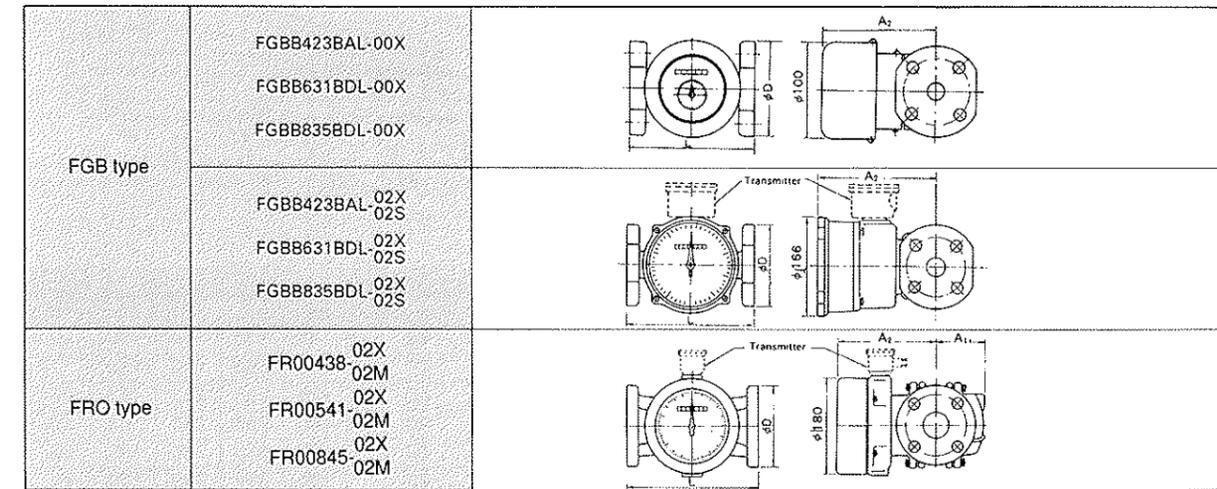
Specifications for each type

Model	Bore (mm)	Model No.			Pointer (1/rev)	Integrating counter		Transmitter			Flow range (t/h) (Accuracy :±0.5%)				
		Direct-reading integrating type	Direct-reading integrating type with reset counter	Direct-reading integrating type with transmitter		Number of digits	Minimum Unit (t)	Type	Transmission unit (t/p)	Wiring connection fitting	Fluid Viscosity	Kerosene, Light oil	A heavy oil	B, C heavy oil	
FGB type	15	FGBB423BAL-00X 02X	FGBB423BAL-04X	FGBB423BAL-02S 04S	1	7	1	Reed switch	0.1, 1	Gland standard JIS20a (JIS F8801) or PF1 2 Female	Normal operation	Conditions	10~200	5~200	—
	20	FGBB631BDL-00X 02X	FGBB631BDL-04X	FGBB631BDL-02S 04S								40~1,250	20~1,250	10~1,250	
	25	FGBB835BDL-00X 02X	FGBB835BDL-04X	FGBB835BDL-02S 04S	10	(6 digits for 00X type)	10					150~3,000	50~3,000	25~3,000	
FRO type	40	FR00438-02X (RO11AB-1-A4)	FR00438-04X (RO11AB-2-A4)	FR00438-02M 04M (RO11AB-1L-A4) 2L-A4)	10	7	10	Micro-switch	1, 10	Same as above	Normal operation	Intermittent	800~6,000	100~7,000	50~7,000
												Continuous	800~4,500	100~6,000	50~6,000
												Max.	7,000	8,000	8,000
	50	FR00541-02X (RO12-1-A4)	FR00541-04X (RO12-2-A4)	FR00541-02M 04M (RO12-1L-A4) 2L-A4)	10	7	10	Micro-switch	1, 10	Same as above	Normal operation	Intermittent	1,500~13,000	250~15,000	100~15,000
												Continuous	1,500~9,000	250~13,000	100~13,000
												Max.	15,000	17,000	17,000
80	FR00845-02X (RO53-1-A4)	FR00845-04X (RO53-2-A4)	FR00845-02M 04M (RO53-1L-A4) 2L-A4)	100	7	100	Micro-switch	10, 100	Same as above	Normal operation	Intermittent	3,500~35,000	600~40,000	300~40,000	
											Continuous	3,500~25,000	600~35,000	300~35,000	
											Max.	40,000	45,000	45,000	

Note: (1) Except in the counter section 00X, an attachment which tilts the counter unit upwards 45° is available as option. (Model code example: FR00438-02M-T)
 (2) When choosing FCD400 (Ductile Iron) for FRO type body material, material code is "BDE" is added to Model No. (Model code example: FR00438BDE-02X)

Model	Bore (mm)	Direct-reading integrating type	Direct-reading integrating type with reset counter	Direct-reading integrating type with transmitter
FGB type	15 20 25	00X		
		02X	04X	02S
		02X	04X	02M
	40 50 80	02X	04X	02M

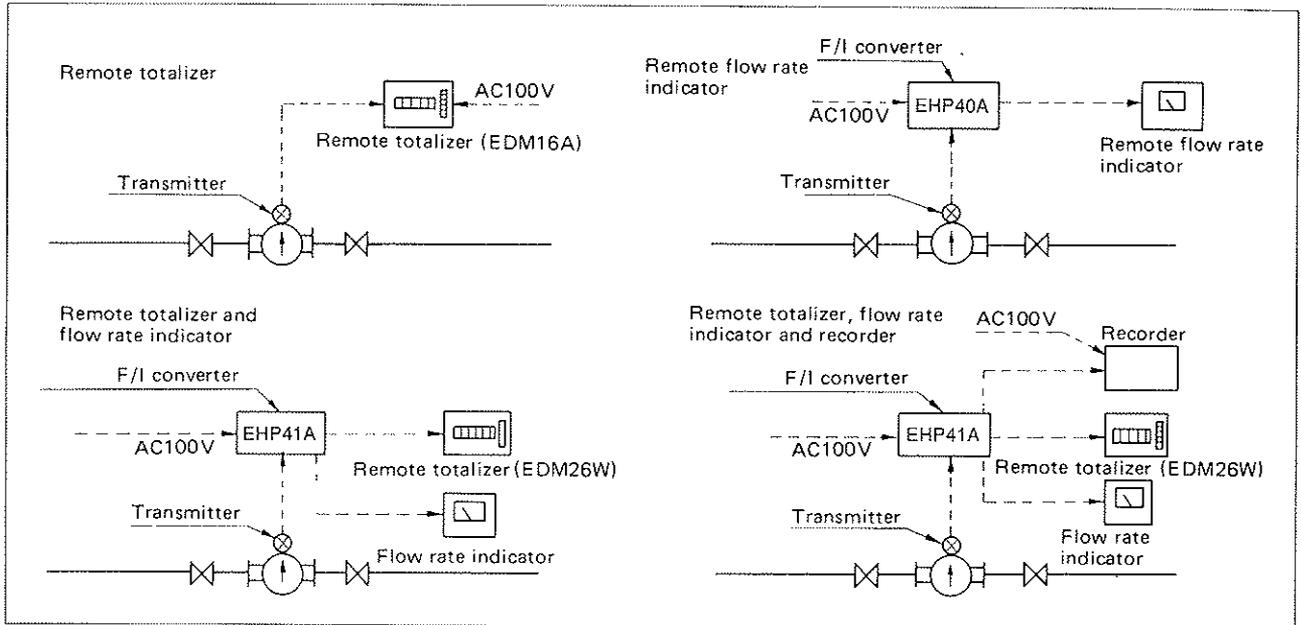
Dimension drawing



Dimension table

Model	Model No.	Dimensions (mm)	Flange dimensions (mm)				Approx. weight (kg)
			φD	L	A1	A2	
FGB type	FGBB423BAL-00X	15	95	130	—	112	3.3
	FGBB631BDL-00X	20	100	170	—	122	4.2
	FGBB835BDL-00X	25	125	200	—	133	7.5
	FGBB423BAL-02X 02S	15	95	130	—	181	6.0
	FGBB631BDL-02X 02S	20	100	170	—	176	7.0
FRO type	FGBB835BDL-02X 02S	25	125	200	—	187	10.0
	FR00438-02X 02M	40	140	200	77	177	17
	FR00541-02X 02M	50	155	250	99	190	20
	FR00845-02X 02M	80	185	300	125	206	40

Example of application of flow meter with transmitter



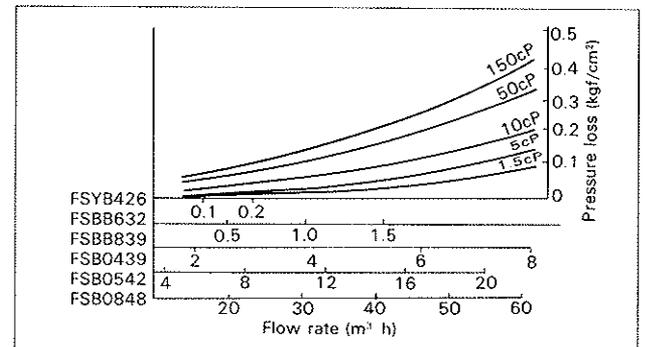
Strainer

A strainer is a necessary accessory to a flowmeter. Tokico manufactures various sizes of strainers to suit the bore of the flowmeter.

Common specifications

Construction		Bucket type (The bore 15mm is Y-type)
Fluid		Oil
Material	Body	Cast iron (FC250)
	Screen	Stainless steel (SUS304)
Mesh	For FGB type flowmeter	200 mesh (bore: 15mm) 80 mesh (bore: 20~25mm)
	For FRO type flowmeter	40 mesh (over 10 cp), 80 mesh (below 10 cp)
Paint color		Munsell 1.4PB3.1/1.2

Pressure loss characteristics

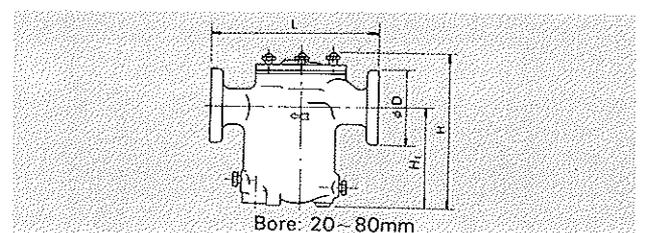
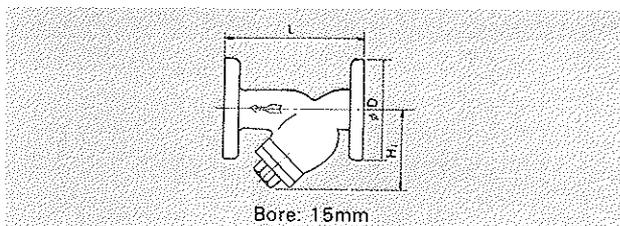


Standard specifications for each model

Model No.	Old model	Bore (mm)	Flange rating	Max. working pressure (kgf/cm²)	Hydraulic test pressure (kgf/cm²)	Dimensions (mm)				Weight (kg)
						φD	L	H	H ₁	
FSYB426BAP	YA04-A7	15	JIS10kgf/cm²FF	10	20	95	125	—	70	2
FSBB632BAP	SA06-A7	20	JIS10kgf/cm²FF	10	20	100	180	147	110	7
FSBB839DAP	SL1-A7	25	JIS20kgf/cm²FF	20	40	125	295	263	163	15
FSB0439DAP	SL1AB-A7	40	JIS20kgf/cm²FF	20	40	140	295	263	163	16
FSB0542BAP	SA2-A7	50	JIS10kgf/cm²FF	10	20	155	320	285	185	22
FSB0848BAP	SA3-A7	80	JIS10kgf/cm²FF	10	20	185	395	380	259	41

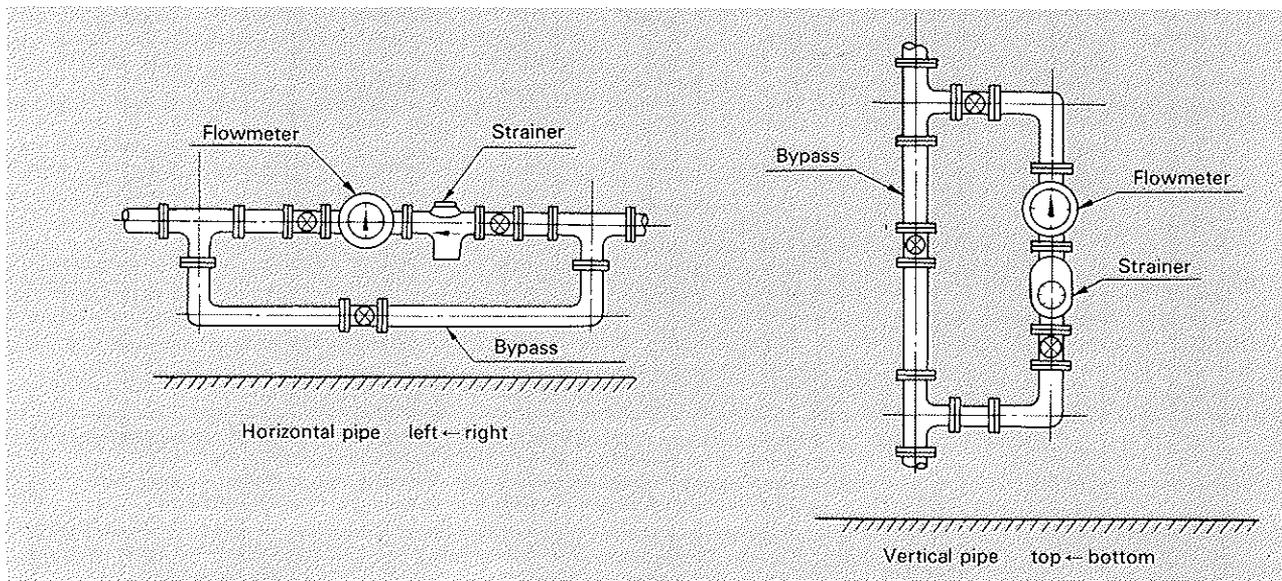
Note: For bore of 25mm and 40mm, JIS20 kgf/cm²FF flange specification are the same as those of JIS10 kgf/cm²FF.

Dimensional drawing



Precautions for piping and operation

- (1) Most of the causes for trouble are attributed to the dirt and foreign matter which enter the inside of the flow meter when piping is provided. Take care for the cleaning of the dirt and the foreign matter before measuring.
- (2) In the case of new piping, a lot of fine scale may exist in the piping. Before installing the flowmeter, pass the fluid through a bypass in order to flush out any scale.
- (3) When connecting the piping to a flowmeter, take care not to distort the body of the flowmeter or not to mistake flow direction of the flowmeter.
- (4) Be sure to fit a strainer directly in front of the inlet of the flowmeter as shown in the figure below.
- (5) Be sure to operate the flowmeter within the flow rate, pressure and temperature range embossed on the nameplate of the counter unit.



Instructions for making enquiries

- (1) When enquiring a flowmeter, be sure to indicate the type code (e.g. FR00541-04X), fluid name, and transmission unit (in the case of a flowmeter with transmitter).
- (2) Specify the following only when they deviate from the standard specifications.
(flow direction, paint color, power supply, cable connect standards, attachment for tilting counter unit by 45°)

Please note that dimensions and other specifications are subject to change without prior notice.



TOKICO TECHNOLOGY LTD. Overseas Sales Department

3-9-27 Tsurumi Chuo, Tsurumi-ku, Yokohama-shi,
Kanagawa 230-0051, Japan
TEL. 81-45-504-7584
FAX. 81-45-504-7550
E-mail : eigyo-yushutsu@tokicotechno.co.jp